

What is claimed is:

1. A pressure sensor device comprising:

a first piezoelectric substrate having a surface acoustic wave element for reference formed on an upper surface thereof;

a second piezoelectric substrate that is thinner in thickness than the first piezoelectric substrate and having a surface acoustic wave element for pressure detection formed on a lower surface thereof; and

a sealing member to be joined to the upper surface of the first piezoelectric substrate and to the lower surface of the second piezoelectric substrate so as to form a space enclosed by the sealing member between the first piezoelectric substrate and the second piezoelectric substrate.

2. The pressure sensor device as set forth in Claim 1, wherein the elements are disposed so that at least a part of the surface acoustic wave element for reference is opposed to the surface acoustic wave element for pressure detection.

3. The pressure sensor device as set forth in Claim 1, wherein thermal expansion coefficients of both of the piezoelectric substrates in at least one direction are substantially the same.

4. The pressure sensor device as set forth in Claim 1, wherein the both piezoelectric substrates are made of piezoelectric single crystals having the same composition, and cut angles of both of the piezoelectric substrates and propagating directions of surface acoustic waves with respect to the crystal axis of

the piezoelectric single crystal are substantially the same or are crystallographically equivalent to each other.

5. The pressure sensor device as set forth in Claim 1, wherein the sealing member is made of a conductive material and is electrically connected to a ground terminal provided on the first piezoelectric substrate.

6. The pressure sensor device as set forth in Claim 1, further comprising:

an electrode pad electrically connected to the surface acoustic wave element for pressure detection, the electrode pad being provided on the lower surface of the second piezoelectric substrate within the space enclosed by the sealing member; and

a connection pad electrically connected to the electrode pad via a conductive bonding material, the connection pad being provided on the upper surface of the first piezoelectric substrate inside the sealing member.

7. The pressure sensor device as set forth in Claim 1, further comprising:

an extended portion formed by extending one end of one of the both piezoelectric substrates while the end is disposed apart from the other piezoelectric substrate; and

an acceleration detecting element for detecting an acceleration disposed on the extended portion.

8. The pressure sensor device as set forth in Claim 7, wherein the extended portion is formed on the second piezoelectric

substrate.

9. The pressure sensor device as set forth in Claim 7, comprising:

an oscillating circuit for emitting a pressure detection signal based on output signals from the surface acoustic wave elements for pressure detection and for reference to outside;

an acceleration detecting circuit for emitting a predetermined electric signal based on an acceleration detection signal from the acceleration detecting element;

a power supply means for supplying electric power to the oscillating circuit; and

a power supply control circuit for controlling an electric power supply from the power supply means to the oscillating circuit;

.....wherein the power supply control circuit controls an electric power supply from the power supply means based on whether the acceleration has exceeded a threshold value or not.

10. The pressure sensor device as set forth in Claim 7, wherein the acceleration detecting element is formed of a surface acoustic wave element.

11. The pressure sensor device as set forth in Claim 1, comprising an antenna pattern formed on the first piezoelectric substrate or on the second piezoelectric substrate and electrically connected to the oscillating circuit for emitting a predetermined electric signal based on pressure information

from the surface acoustic wave elements for reference and pressure detection.

12. The pressure sensor device as set forth in Claim 11, wherein the antenna pattern is adhered to the upper surface of the second piezoelectric substrate.

13. The pressure sensor device as set forth in Claim 12, wherein the antenna pattern is formed in an area excluding an area immediately above the surface acoustic wave element for pressure detection.

14. The pressure sensor device as set forth in Claim 11, wherein the antenna pattern is meanderingly shaped.